

# ENZYME WEBQUEST

Name \_\_\_\_\_ Per \_\_\_\_\_

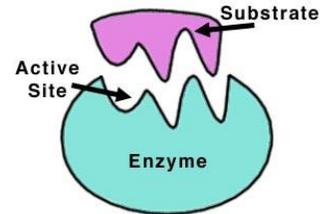
Date \_\_\_\_\_

WEBSITE #1: <http://www.northland.cc.mn.us/biology/Biology1111/animations/enzyme.html>

Choose ENZYMES: The BASICS (wait for the bar on the bottom to turn yellow before clicking on "next").

1. SLIDE ONE: Enzymes are \_\_\_\_\_ that serve as \_\_\_\_\_. They \_\_\_\_\_ up or \_\_\_\_\_ reactions, but ALWAYS remain \_\_\_\_\_.

2. SLIDE TWO: What is an ACTIVE SITE?



3. SLIDE THREE: Each \_\_\_\_\_ acts on a specific \_\_\_\_\_.

4. What is a SUBSTRATE?

5. DRAW an ENZYME and SUBSTRATE below. Make each a DIFFERENT COLOR and label each.

6. SLIDE FOUR: What is the INDUCED FIT?

7. SLIDE FIVE: YOU JUST DRANK A GLASS OF MILK! DRAW THE CATALYTIC CYCLE OF LACTOSE BELOW! LABELING THE SUBSTRATE, SUBSTRATE ENZYME COMPLEX, THE ACTIVE SITE, AND THE PRODUCTS. MAKING EACH A DIFFERENT COLOR!

8. Someone who is "LACTOSE INTOLERANT"...is lacking which enzyme? \_\_\_\_\_

## Enzyme Catalysis

### Introduction

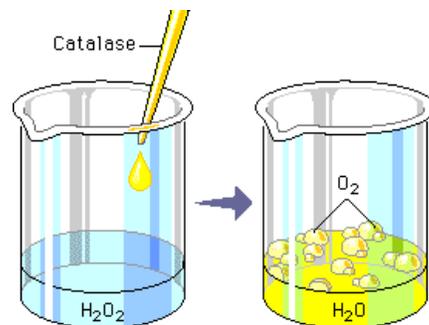
9. \_\_\_\_\_ catalyze reactions by lowering the \_\_\_\_\_
10. \_\_\_\_\_ necessary for a reaction to occur.

### Key Concepts

11. \_\_\_\_\_ catalyze reactions by lowering the \_\_\_\_\_ necessary for a reaction to occur. The molecule that an enzyme acts on is called the \_\_\_\_\_. In an enzyme-mediated reaction, \_\_\_\_\_ molecules are changed, and \_\_\_\_\_ is formed. The \_\_\_\_\_ molecule is \_\_\_\_\_ after the reaction, and it can continue \_\_\_\_\_

12. Each \_\_\_\_\_ is \_\_\_\_\_ for the \_\_\_\_\_ it will catalyze. In this laboratory,

Enzyme = catalase, found in your liver  
Substrate = hydrogen peroxide ( $H_2O_2$ )  
Products = water and oxygen



13. DRAW THE REACTION THAT TOOK PLACE ON THE LEFT USING YOUR OWN SHAPES, LABELING THE SUBSTRATE, ENZYME, ACTIVE SITE ON THE ENZYME, ENZYME-SUBSTRATE COMPLEX, AND THE PRODUCTS.

### Enzyme Structure

14. Enzymes are globular \_\_\_\_\_. Their folded conformation creates an area known as the \_\_\_\_\_. The nature and arrangement of \_\_\_\_\_ in the \_\_\_\_\_ make it specific \_\_\_\_\_.

15. DRAW A MODEL OF AN ENZYME, ACTIVE SITE, AND SUBSTRATE BELOW:

### Binding Specificity

16. Even when different \_\_\_\_\_ molecules are present, only those that have the \_\_\_\_\_ to the \_\_\_\_\_ are able to bind with the enzyme's \_\_\_\_\_.

### Induced Fit

17. Observe the INDUCED FIT ANIMATION and describe what happens below:

### Some Factors That Affect Enzyme Action

18. The conformation of an enzyme is maintained by interactions between the various \_\_\_\_\_ that compose it, and this conformation is sensitive to \_\_\_\_\_. Two important influences are \_\_\_\_\_ and \_\_\_\_\_. When an enzyme's \_\_\_\_\_ is significantly altered because of \_\_\_\_\_ or \_\_\_\_\_ variation, the enzyme may no longer \_\_\_\_\_. An enzyme is said to be \_\_\_\_\_ when it loses its functional shape.

### pH and Enzyme Function

19. Each enzyme functions best within a \_\_\_\_\_. For example, the enzyme \_\_\_\_\_, which works in your stomach, functions best in a strongly \_\_\_\_\_ environment. Lipase, an enzyme found in your \_\_\_\_\_, works best in a \_\_\_\_\_ environment.

20. When the pH changes, the active site \_\_\_\_\_ and affects \_\_\_\_\_. What happens to catalysis when an enzyme is subjected to a pH far from its optimum range?

21. WATCH THE ANIMATION AND DESCRIBE WHAT YOU SEE BELOW:

## Temperature and Enzyme Function

22. Chemical reactions speed up as \_\_\_\_\_ is increased, so, in general, \_\_\_\_\_ will \_\_\_\_\_ at higher temperatures. However, each enzyme has a temperature \_\_\_\_\_, and beyond this point the enzyme's \_\_\_\_\_ is lost. \_\_\_\_\_ temperatures will \_\_\_\_\_ most enzymes.

**WEBSITE #3:** <http://bcs.whfreeman.com/thelifewire/content/chp06/0602001.html>

GO TO ANIMATION, then to STEP THROUGH

1<sup>st</sup>-Add a SUBSTRATE

2<sup>nd</sup>-Add an ENZYME

PRESS PLAY

23. Describe what happened:

1<sup>st</sup>-Add a SUBSTRATE

2<sup>nd</sup>-Add an ENZYME

3<sup>rd</sup>-Add a COMPETITIVE INHIBITOR

PRESS PLAY

24. Describe what happened:

1<sup>st</sup>-Add a SUBSTRATE

2<sup>nd</sup>-Add an ENZYME

3<sup>rd</sup>-Add a NON-COMPETITIVE INHIBITOR

PRESS PLAY

25. Describe what happened:

26. What is the difference between a NONCOMPETITIVE INHIBITOR AND A COMPETITIVE INHIBITOR?